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STUDY APPROACH

Kates, Peat, Marwick & Co.

March 1972

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CITY OF HAMILTON

HAMILTON TRANSPORTATION STRATEGY STUDY

STUDY APPROACH

Prepared by
Kates, Peat, Marwick & Co.

March, 1972

KATES, PEAT, MARWICK & Co.

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TORONTO 1, ONTARIO
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March 9, 1972

Chairman
Study Committee
City of Hamilton
City Hall
Hamilton, Ontario

Dear Sir:

Hamilton Transportation Strategy Study
Study Approach

We are pleased to submit our report on the recommended approach to the Hamilton Transportation Strategy Study. This report describes the proposed objectives, scope, general work program and arrangements for the study, and includes estimates of the associated staff, time and budget requirements.

The report is based on an extensive series of interviews with representatives of the City and the Province, industrial leaders, and representatives of other interested groups. We wish to acknowledge the valuable advice which was provided by those interviewed and their kind cooperation throughout the course of this assignment.

THE STUDY COMMITTEE

The City of Hamilton is establishing a transportation planning process to provide an adaptive mechanism for decision-making and

for programming and implementing transportation improvements. A Study Committee has been formed to direct the establishment of this planning process. The membership of the Committee, as approved by the City Council, comprises the City Engineer, the City Traffic Commissioner, the City Planning Commissioner, the City Treasurer, and representatives of the Hamilton Street Railway (H.S.R.) and the Ontario Department of Transportation and Communications (DTC). Mr. David Perry, City Clerk's Department, is the Secretary of the Study Committee.

THE STRATEGIC PLANNING CONCEPT

The immediate requirement in the establishment of the transportation planning process is to carry out a strategic planning study to evaluate the alternative choices available to the City in terms of possible transportation systems, their inter-relationships with future development patterns, and the expansion of the water and sewerage systems. The interviews with community leaders indicated that there is a broad spectrum of issues and alternatives related to transportation in the City, including the relationship between the type of urban development and the type of transportation system, the related requirements for trunk water and sewerage facilities, the relative costs and benefits of different types of transportation systems and the role of transportation in the social and economic life of the City.

The Transportation Strategy Study will be aimed at presenting the transportation and servicing implications of several development

alternatives as a basis for public discussion and policy consideration. This study, when combined with other studies now underway of housing, neighbourhood and economic needs, will provide important input to the development of an Official Plan for the City of Hamilton. The study will also indicate the transportation improvements which will likely be required over the short term, regardless of the actual pattern of development.

The Transportation Strategy Study will complement the current studies of transit operations in the City and vicinity. These transit studies are focussed on immediate operational improvements whereas the Strategy Study will be oriented towards the future development of the total transportation system.

SCOPE OF STUDY

Geographic Scope

Transportation program recommendations will be made only for the City of Hamilton. The inter-relationships between Hamilton's development and transportation alternatives, and those of the surrounding areas, however, will be indicated to provide a technical basis for discussions between the City of Hamilton and other jurisdictions regarding matters of common interest.

Planning Time Horizons

Possible growth to the year 2000 will be considered in identifying alternative development patterns. This long range viewpoint

will provide a context for evaluating the transportation alternatives for the medium range future (1980-1990) and for identifying short range improvements to the year 1980.

Travel Modes Included

The Transportation Strategy Study will be concerned with:

- arterial roads, expressways and freeways
- truck route system
- public transit system
- parking system
- pedestrian system
- railways, port and airport to the extent that they affect urban transportation and development needs and decisions.

RECOMMENDED APPROACH

The interviews during this assignment revealed that there is an extensive information base for the Transportation Strategy Study. Accordingly, it is recommended that the Strategy Study focus primarily on the evaluation of transportation alternatives, using existing information, supplemented by some limited data collection and analysis.

A twelve month work program is described in Chapter III of this report. The bulk of the work program, however, will be accomplished during the first eight months of the study. A draft report on the findings of the study will be completed by the end of the

eighth month. The final report will be completed after review and discussion with the Study Committee, the Board of Control, City Council and other interested organizations, in particular the Citizen's Committee on Transportation.

Presentations will be made, as appropriate, during the course of the study. The objectives of these presentations will be to familiarize interested groups with the content of the study and to obtain their input to the process.

ARRANGEMENTS FOR THE STUDY

It is recommended that a joint team approach be employed for carrying out the study. Under this arrangement, City and Provincial staff would be assigned to the team on a full-time basis for specified intervals of time. Appropriate consultants would be retained to assist the City and Provincial staff and to provide technical direction to the study and some specialized technical services.

The Study Committee would be responsible for the direction of the Transportation Strategy Study. The joint team would submit a statement to the Study Committee each month showing the budget expended and progress achieved to date, and outlining the work planned for the next period.

It is estimated that about 865 man-days of effort will be required to complete the Transportation Strategy Study. This effort

is equivalent to an average of five professional staff on a full-time basis. In addition to this estimate, approximately 450 man-days of secretarial and drafting services will be required.

It is estimated that the participation of City professional staff in the study will amount to 350 man-days. On this basis, the estimated requirement for consultants' services is 515 man-days.

The required budget for the consultants retained for the Transportation Strategy Study will be \$100,000. This budget will provide for \$86,000 in professional fees, \$7,000 for expenses, and \$7,000 for contingencies. It is understood that this budget is eligible for a 75 per cent subsidy from the Ontario Department of Transportation and Communications, and that the City's share of the consultant's budget would be \$25,000.

In addition to the provision of 350 man-days for the participation of City professional staff, it is proposed that the City provide office facilities and services for the study, including report printing.

It is understood that the Ontario Department of Transportation and Communications will participate directly in the Study. The Department's contribution will include the adaptation of its computer-based traffic model (TARMS), the provision of computer services, and advisory assistance as determined during the course of the study.

We believe that the recommended approach to the Transportation Strategy Study, as outlined in this report, will provide an effective basis for addressing the transportation issues and opportunities in the City of Hamilton. The Strategy Study will provide a means for achieving a truly continuing transportation planning process in the City.

Kates, Peat, Marwick & Co. are pleased to have the opportunity of participating in this important assignment.

Yours truly

Kates, Peat, Marwick & Co.

CITY OF HAMILTON

HAMILTON TRANSPORTATION STRATEGY STUDY
STUDY APPROACH

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I - INTRODUCTION

BACKGROUND

The City of Hamilton is establishing a transportation planning process to provide an adaptive mechanism for decision-making and for programming and implementing transportation improvements. A Study Committee has been formed to direct the establishment of this planning process. The membership of the Committee, as approved by the City Council, comprises the City Engineer, the City Traffic Commissioner, the City Planning Commissioner, the City Treasurer, and representatives of the Hamilton Street Railway (H.S.R.) and the Ontario Department of Transportation and Communications (DTC). Mr. David Perry, City Clerk's Department, is the Secretary of the Study Committee.

The immediate requirement in the establishment of the process is to carry out a strategic planning study to evaluate the alternative choices available to the City in terms of possible transportation systems, and their inter-relationships with future development patterns and the expansion of the water and sewerage systems. Following an appraisal and a recommendation by the PET Committee, (Planning, Engineering and Traffic) the City of Hamilton retained the firm of Kates, Peat, Marwick & Co. to define an approach for the strategic planning study and to estimate the associated time, budget, and staff requirements.

The strategic planning study of transportation in the City of Hamilton will complement the current studies of transit operations in

the City and in the Wentworth-Burlington area. These transit studies are focussing on immediate operational improvements whereas the Transportation Strategy Study will be oriented towards the future development of the total transportation system.

DEFINING THE STUDY APPROACH

Seven tasks were involved in carrying out this assignment.

These tasks were as follows:

1. Conducting a series of structured interviews with representatives of the City, the Province and other organizations to determine the expected outputs from the study and to identify the central considerations in development planning for the City.
2. Defining the objectives and the functional and geographical scope of the study.
3. Reviewing the existing information and planning methodologies which could be utilized, as a basis for recommending an appropriate methodology for the study.
4. Recommending an operational approach for the management and staffing of the study.
5. Developing a general work program approach.
6. Estimating broad study time and budget requirements.
7. Preparing the Study Approach Report to provide a basis for proceeding with the Study.

Authorization to proceed with this assignment was received on December 20, 1971. This Study Approach Report describes the results and the recommendations arising from the work program as outlined above.

ORGANIZATION OF THE REPORT

This chapter describes the background and the assignment for defining the Study Approach. Chapter II summarizes the results of the interviews and the type of approach which is proposed for the Study. Chapter III describes the proposed objectives, scope and general work program. The proposed study organization and direction, and broad estimates of time, budget and staff requirements are presented in Chapter IV.

The two appendices attached to the report are:

- A List of Interviews
- B List of References.

II - TRANSPORTATION IN HAMILTON AND THE HEAD OF THE LAKE AREA - ISSUES, OPPORTUNITIES AND TRADE-OFFS

OPINIONS OF COMMUNITY LEADERS

As a major source of information for this report, Messrs. Neal A. Irwin and Ewen S. Fisher undertook a series of interviews with municipal leaders at both the political and department head levels, as well as industrial leaders and representatives of special interest groups. While Mr. Fisher, in particular, is familiar with the Hamilton area, having lived and worked here for many years, it was felt desirable by both the Committee and the consultant that these interviews be carried out to provide an up-to-date and reasonably comprehensive survey of community leaders' opinion on transportation and related development issues in the area. In addition, the interviews provided an opportunity for discussion of the proposed study approach, allowing the community leaders contacted to consider the approach and comment on it in a preliminary manner.

The list of persons interviewed is included as Appendix A, while Appendix B lists the reference documents identified and obtained during the interviews. Some of the major issues which were identified during the interviews are discussed briefly below. In this discussion, we emphasize the "trade-offs" among various transportation, development and servicing possibilities; that is, the benefits and costs which

must be borne in mind when considering different "solutions" to the urban development, transportation and related problems facing the area.

MAJOR
PLANNING TRADE-OFFS

Urban Development

The strong interactions between urban development and transportation were generally recognized by those interviewed. For example, it was recognized that major increases in Mountain access capacities will be required if new residential development is channelled largely southward, while major urban development to the east and/or west would imply major increases in east-west capacities. It was also recognized that the degree of separation between major places of work and of residents affects significantly the length of work trips and therefore the amount of transportation capacity required. For example, development of an industrial park on the Mountain, in conjunction with major residential development on the Mountain, might to some extent reduce the need for peak-period transportation capacity between the Mountain and the lower City, since Mountain residents might then be able to find employment opportunities closer to home. On the other hand, industry on the Mountain would attract truck traffic and possibly generate environmental problems, so that the type of industry locating there would have to be carefully considered.

Another trade-off commented on was that between centralized and decentralized commercial development. It was generally recognized

that the amount of commercial development in an urban area bears a direct relationship to the number of people living in the area and that a very high rate of commercial development in the suburbs may, if carried too far, rob the downtown area of needed vitality. The need to study and understand how much commercial floor space can be supported in central and decentralized locations was generally acknowledged.

Some understanding was also demonstrated of the impact which major new transportation facilities would probably have upon urban development patterns. For example, a rapid transit facility linking the Mountain with the central business district and harbour industrial areas would have the effect of encouraging residential growth on the Mountain, reinforcing the economic strength of the central business district and industrial areas, and encouraging those who work in the latter areas to live on the Mountain. Conversely, a circumferential transportation facility, such as the Mountain and the Red Hill Creek Freeways, would tend to favour the location of new work places to the east and west above the escarpment and to proportionately weaken the economic links between the Mountain and the central City. It was recognized, therefore, that transportation planning should attempt to take this type of impact into account.

Approach to Planning

Many of those interviewed commented on the new and changing roles of the City of Hamilton as a result of major developments such as the expansion of McMaster University, the development of Jackson

Square and the Theatre-Auditorium, the provision of new air services at Hamilton Airport and the potential industrial developments at Lake Erie.

It was noted during these discussions that an adaptive approach, rather than a discrete 'master plan' approach should be employed in planning transportation and development programs. There was some consensus that planning should proceed on a dynamic basis and should be capable of responding to change and unforeseen events. Good information systems are the key to achieving this flexibility. Many of those interviewed referred to the lagging implementation of the 1963 Hamilton Area Transportation Study (HATS) Plan as a case in point and, in particular, to the impact of the decision against proceeding with the construction of the proposed East-West Freeway. It was indicated that the approach to transportation planning must provide a means for evaluating options as the trend of decisions evolves over time.

Transportation

As one would expect, the number of transportation issues and trade-offs identified was very large. Of major concern to many interviewed was the negative environmental impact of increased transportation volumes on existing built-up areas or conservation areas such as Cootes Paradise. While it was recognized that continuing growth in the Head of the Lake area will require increased transportation system capacities in the central part of the area, the point was made that more efficient types of transportation, such as public transit, should be

utilized wherever possible in order to reduce or prevent negative environmental effects.

In general, there was a recognition of the major trade-offs possible between providing required new transportation capacities by means of public transit or private automobile facilities. Public transit, being more efficient operationally, requires less urban land and tends to have less of a negative environmental impact in providing new capacity. On the other hand, public transit will not be widely used unless it provides a level of service, in terms of travel time, convenience and comfort, which approaches that provided by the private automobile. If service improvements are not made, new transit capacities provided may not be fully utilized and severe operating deficits may be experienced. Considerable discussion took place on the concept of "Telebus", a demand-responsive form of mini-bus service which picks travellers up at their door and takes them either to their final destination or to a trunk line transit facility for longer trips. It was recognized that this type of service, combined with conventional bus routes and some form of rapid transit, could significantly increase the ridership and cost-effectiveness of transit services in the area and produce a number of socio-economic benefits.

It was noted that the significant land requirements for parking space in the industrial and commercial areas could become an increasingly severe problem in the future. Curb parking has been restricted on many arterial streets in order to improve safety and to

increase capacity. It was pointed out that improved public transportation and other measures will be required to minimize the amount of parking in these areas in the future.

Another major trade-off, and one which was debated at length following the 1963 Hamilton Area Transportation Study, concerns the degree to which new roadway capacities can be provided by surface arterial streets versus grade-separated and limited-access freeways or urban expressways. There appears to be some consensus that improved surface arterials should be used where possible, provided that negative impacts on existing neighbourhoods and businesses can be kept to a minimum. The rather complex trade-offs in this area were recognized to some extent; it was acknowledged, for example, that, while an urban freeway tends to have more of an environmental impact than a surface arterial street, a freeway properly located may divert traffic from critical areas to corridors in which vehicular and truck traffic is less of a nuisance, thereby reducing the overall environmental problems involved.

It was pointed out by a number of those interviewed that the implications of port, railway, and airport developments should be taken into account in any transportation study, insofar as they would affect transportation requirements within the area. The impact of any rail relocations was particularly emphasized, both in terms of removing level crossing conflicts and as a possible means of providing one or more right-of-ways in which new or improved urban transportation facilities could be located.

The particular importance of truck traffic in Hamilton, owing to its heavy industrial economic base, was repeatedly emphasized. Unless improved facilities can be provided for truck traffic, there may be a tendency for economic activities to locate in other areas where congestion is not as severe. Improved truck routes and other measures can be considered for diverting truck traffic from existing built-up areas in which it is an increasing nuisance.

The issue of public services, by which we mean in this report trunk water and sewerage facilities, was also raised. It was pointed out that, when considering possible urban development patterns and transportation improvements, the effects of these on the cost and efficiency of public services should be taken into account.

THE STRATEGIC PLANNING CONCEPT

Bearing in mind the above types of trade-offs, and the many other issues and opportunities which were identified during the interviews, it becomes evident that a number of broad trade-offs in the areas of urban development, transportation and public services should be studied and quantified before more detailed transportation recommendations are made.

Under this strategic planning approach, several urban development concepts would be put forward for the area, representing the range of probable and desirable development alternatives in terms of the

distribution of people, jobs and commercial activity throughout the area. For each of these development concepts, studies would be carried out to identify the existing and new transportation system capacities which would be required to carry persons and goods within each major travel corridor in the area.

Broad assumptions would then be made, for study purposes, of the transportation facilities and services which would be required to carry these volumes of persons and goods. For example, one could assume that the existing percentage of trips by public transit would be maintained, and could then show the number of lanes of arterial road capacity which would be required in each travel corridor. One could then postulate various actions to increase transit usage, such as improved public transit facilities, pricing and legislative actions, and estimate the additional ridership that would be attracted to transit under these conditions. The resulting number of arterial roadway lanes which would be required in each corridor could then be compared with the number of lanes in the previous case. Broad capital and operating costs would be developed for the various alternatives, including parking as well as roadway and transit facilities.

The environmental impact of the various alternatives studied would also be indicated.

Also shown would be the broad capital and operating costs of additional trunk water and sewerage facilities required to service proposed new development areas under each alternative; for example,

the relative costs of water supply for Mountain developments versus that for development below the escarpment.

For the several development concepts studied, a "strategy table" and a "strategy tree" would be developed showing the major transportation and public services improvements which would be required over time to service and make possible each of the concepts. Also shown in the strategy table would be a comparison among these major decisions for the various concepts, pointing out the degree to which the alternative development concept options can be kept open, and points in time at which a given decision would close out certain development and transportation options. The "strategy tree and table" would be updated on a regular basis as events occur and decisions are taken over time.

It seems likely that a certain number of transportation improvement elements will prove to be necessary for all of the development concepts, particularly during the first five or ten-year period. Depending upon the nature and extent of these, it may therefore be possible to recommend certain transportation improvement program steps, to be carried out during the period approximately to 1980, as a result of the strategic study. Beyond this, the strategic study would probably make few firm recommendations. Rather, it would present as a basis for public discussion and policy consideration, the transportation and servicing implications of several broad development concepts. The transportation effectiveness and efficiency implications of each concept would be highlighted, including the capital and operating costs for

new transportation facilities and services. The capital and operating costs of public services facilities would be shown, and social, economic and environmental implications would be indicated.

A study of this type, when combined with other studies now in process to determine housing, neighbourhood and economic needs, will provide important input to the development of an Official Plan for the City of Hamilton. It will also provide useful planning input to other parts of the area. Based on the results of such a study, the public and its leaders will be in a position to make decisions on broad development plans and policies.

When this has occurred, it will be possible to carry out the more detailed transportation programming efforts required to plan, design and implement approved transportation facilities and services for the area. While the broad planning alternatives are being studied in the public domain, it will be possible to proceed with the more detailed studies required for those transportation program elements which would be required in any event in the next ten years.

The nature and proposed approach to a "transportation strategy study" to accomplish these ends are outlined in the following chapter.

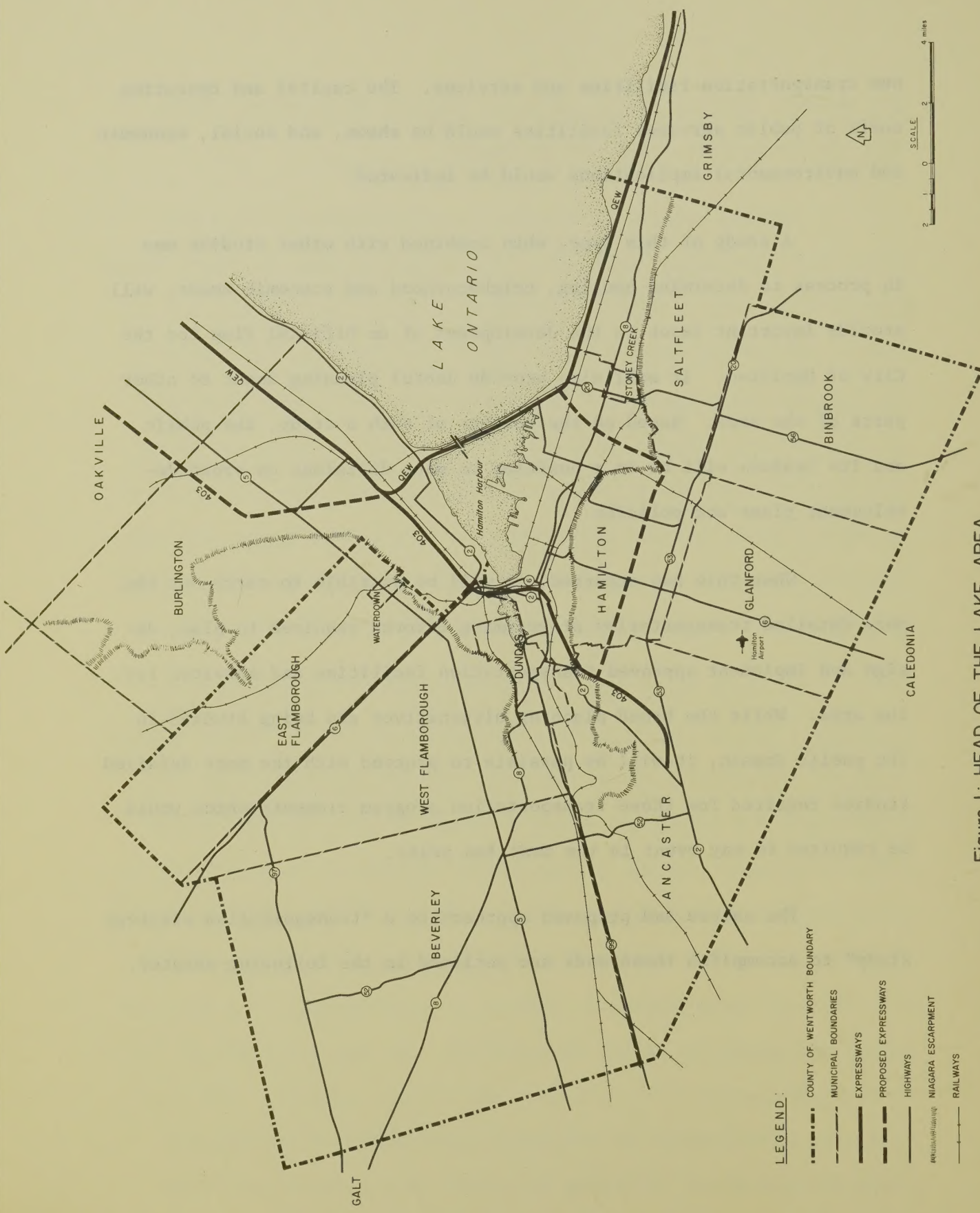


Figure 1: HEAD OF THE LAKE AREA

III - THE TRANSPORTATION STRATEGY STUDY - PROPOSED APPROACH

SCOPE OF STUDY

Geographic Scope

In order to properly appraise the nature and implications of alternative development patterns and transportation systems, the area under consideration during the study must extend beyond the limits of the City of Hamilton. It will be necessary to consider the implications to Hamilton of future growth in the County of Wentworth and the Town of Burlington, and also the impact of the traffic patterns generated by the Toronto area, the Niagara Peninsula, the North Shore of Lake Erie and areas in Southwestern Ontario.

The main area of consideration is shown in Figure 1, opposite. Transportation program recommendations will be made only for the City of Hamilton. The inter-relationships between Hamilton's development and transportation alternatives and those of the surrounding areas, however, will be indicated to provide a technical basis for discussions between the City of Hamilton and other jurisdictions regarding matters of common interest.

While it would be desirable for other jurisdictions to participate officially in the study, such participation is not essential for the study. Interviews with representatives of the County of Wentworth and the Town of Burlington indicated a willingness to

cooperate on an unofficial basis and to provide information and comment as appropriate. The Town of Burlington has recently updated its Transportation Plan and this information will be valuable input to the study. Similarly, the County of Wentworth is updating its road needs information and these data will be of use in the study.

The interviews indicated that it is unlikely that the Town of Burlington and the County of Wentworth will agree to enter the study on an official basis. If this position should change, then all parties would benefit. The proposed Study Approach presented in this chapter, however, is based on unofficial participation by other municipalities.

Planning Time Horizons

The Transportation Strategy Study would be concerned with three types of time horizons, as follows:

- Long Range: the alternative urban development concepts and related transportation and public services implications, as described in Chapter II above, would be studied for a time point some 30 years in the future, that is approximately at the year 2000. Such a long range viewpoint is required to provide a strategic context for shorter range transportation program decisions
- Medium Range: based upon the long range findings, medium range transportation program requirements for the period 1980 to 1990 would also be a concern of the study. Design of transportation facilities is usually based upon a 20-year time horizon, which would produce a "design year" of 1992 or 1993
- Short Range: as outlined in Chapter II above, the Transportation Strategy Study is expected to

produce a number of specific transportation recommendations, if any program elements can be found which are common to all of the development concepts studied. These program elements would more than likely be initiated during the period between now and 1980, and would tend to be required to meet immediate or short range transportation improvements during this period. It is possible that short range recommendations from the study could include certain types of improvements which are more operational in nature and would not require large capital investments.

In considering the time periods referred to above for planning purposes, it should be recognized that the long range and medium range studies will be primarily for the purpose of providing a strategic context within which shorter range recommendations can be made by the Transportation Strategy Study. Based on decisions resulting from the Transportation Strategy Study, it will then be possible to carry out more detailed planning, design and implementation projects to produce the necessary transportation improvements for the medium and long range periods.

Travel Modes Included

The Transportation Strategy Study will be concerned with the following transportation services and facilities.

- arterial roads, expressways and freeways
- truck route system
- public transit system

- parking system
- pedestrian system
- railways, port and airport to the extent that they affect urban transportation and development needs and decisions.

Level of Detail

The Transportation Strategy Study, in view of its strategic nature, will deal in general with regional development, transportation and public services requirements. That is, it will be concerned with broad distributions and densities of residential people and jobs, major regional transportation facilities and services, and trunk water and sewerage facilities. Roadways included in the study will be arterial surface roads and higher type facilities such as junior expressways or freeways. Future transit services will include general types of feeder services such as Telebus, trunk bus routes and rapid transit facilities, but will not include detailed route planning and scheduling. For purposes of estimating transit ridership, general levels of service, in terms of travel time, frequencies and fare levels, will be assumed.

STUDY OBJECTIVES AND MAJOR ISSUES

Based upon the general description given above, we set forth six basic objectives for the Transportation Strategy Study, as follows:

1. To determine several potential urban development patterns for the study area and to set forth the broad transportation and public services implications of each development pattern.

2. To present this information in a form suitable for public review and policy deliberations, including, in a quantitative form where possible, the trade-offs among development concepts, transportation modes and facilities, transportation levels of service, and public services requirements, and showing, where relevant, the social, environmental and economic implications of the various alternatives.
3. To identify those transportation and public services system elements which would be required under any likely and promising development pattern and recommend a basic improvement program based on these.
4. To identify additional transportation and public services system elements which will be contingent on the type of development patterns experienced, thereby providing information on additional transportation and public services system elements which will require decisions during the coming years.
5. To extend the presently available planning information base in preparation for detailed planning and transportation program development which may follow the strategic planning decisions based on this study.
6. To foster a continuous transportation planning and program development process such that the transportation improvement program can be developed, monitored and adapted over time to best meet the needs of those living in the area.

Among the specific issues which were identified during the interviews and which will be addressed during the study are the following:

- an evaluation of the alternatives for east-west movements below the Mountain, including possible redirection of development, improved transit services, increased utilization of existing streets, and new facilities such as a direct connection between Highway 403 and the Port and the industrial area

- an evaluation of mountain access requirements, both transit and road, including a determination of the relationship between these requirements and the scale and type of development on the Mountain, the associated water and sewerage requirements, and social and environmental impacts
- a determination of the requirements for movements into, out and through the City, and the implications of these requirements in terms of development, funding, socio-economic factors, and type of transportation system
- an appraisal of the future utilization of the existing street system for truck, transit and automobile traffic and parking, including truck routes, extended peak hours, and special bus lanes, and the implications of these uses in terms of quality of life, level of service, development constraints and investment requirements
- an investigation of the prospects for employing developing technologies such as Telebus, busways and traffic surveillance, and the types of environments and services for which these modes are best suited
- an evaluation of the potential increases of port, airport and rail traffic, the alternatives for serving such growth, and the implications on urban development and transportation
- general consideration of special facilities such as pedestrian and bicycle ways, and park-and-ride facilities in the commercial and industrial areas
- an evaluation of the potential of multi-purpose corridors
- an analysis of the importance of transportation in the social and economic life of Hamilton including access to job opportunities and educational and social facilities, and the transportation needs of the area's industry and commerce.

INFORMATION BASECity of Hamilton

The interviews during this assignment indicated that there is an extensive information base for the Transportation Strategy Study. The documents which were obtained during the interviews are listed in Appendix B.

The City Planning Department has a number of reports and studies relating to possible directions of future development. The Department has just completed a survey of employment and this information, together with the 1971 census data, will provide an up-to-date basis for analyzing present traffic movements.

The City Traffic Department has maintained a continuing program of traffic surveys for many years. Extensive information is available on traffic volumes and accident frequencies, and there is some travel time data. A parking survey is now underway and this information will be available for the Strategy Study.

The Engineering Department has developed considerable information on water, sewerage and road facilities and costs. A comprehensive computer-based street inventory with condition ratings is available and the Department is now developing a priority rating system for defining road reconstruction programs.

For transit, recent studies have been completed of the operations of the Canada Coach Lines and The Hamilton Street Railway. A physical feasibility study of a mountain access rapid transit line was carried out in 1970. The City Planning Department has also carried out an appraisal of rapid transit and future development in Hamilton.

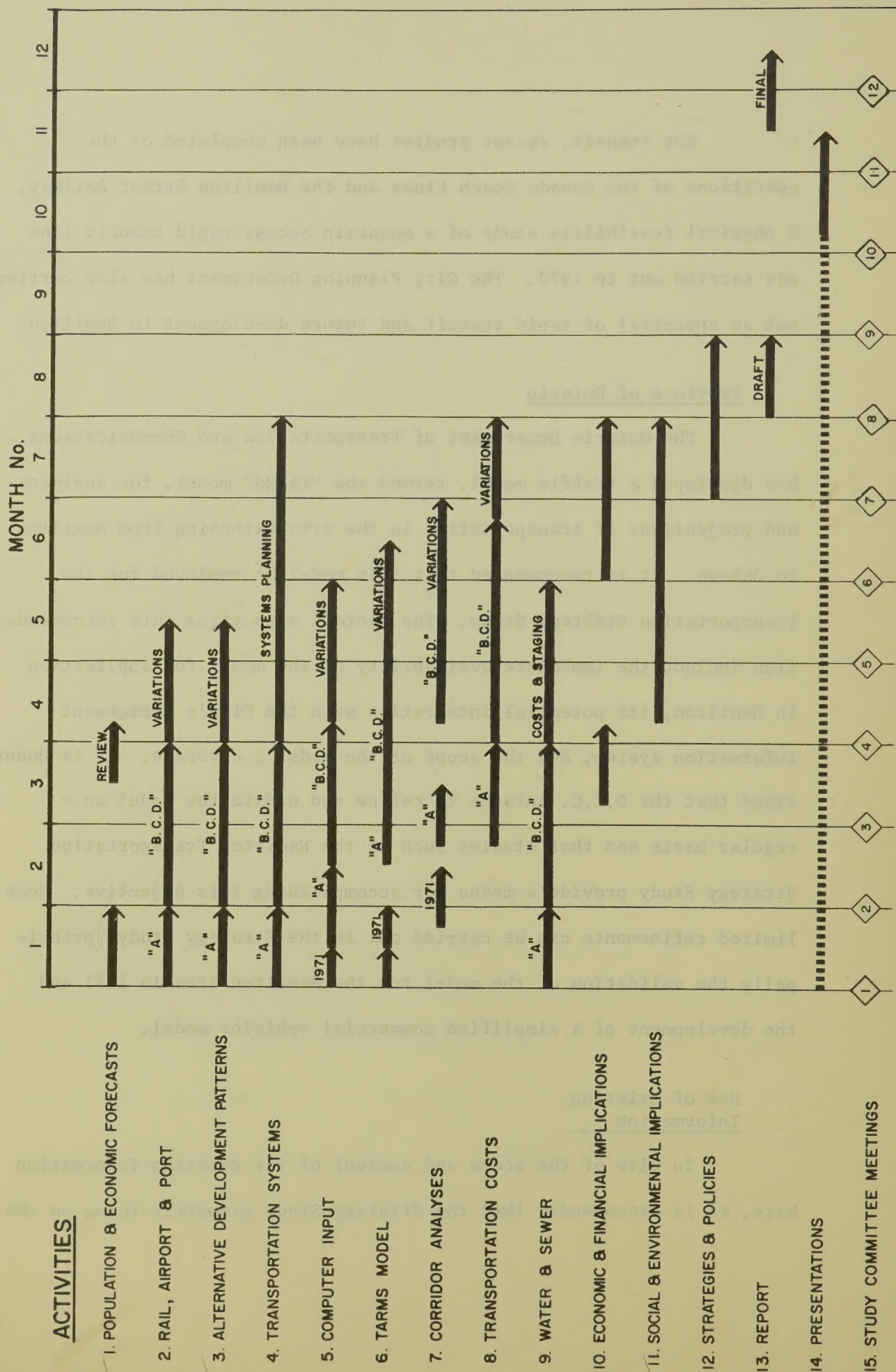
Province of Ontario

The Ontario Department of Transportation and Communications has developed a traffic model, termed the "TARMS" model, for analyses and projections of transportation in the area extending from Hamilton to Oshawa. It is recommended that this model be employed for the Transportation Strategy Study. The factors supporting this recommendation include the immediate availability of the model for application in Hamilton, its potential integration with the City's management information system, and the scope of the model's coverage. It is understood that the D.T.C. intends to refine and update the model on a regular basis and that studies such as the Hamilton Transportation Strategy Study provide a means for accomplishing this objective. Some limited refinements can be carried out in the Strategy Study, principally the validation of the model for the Hamilton area in 1971 and the development of a simplified commercial vehicles model.

Use of Existing Information

In view of the scope and content of the existing information base, it is recommended that the Strategy Study primarily focus on the

Figure 2.



evaluation of transportation alternatives, using existing information, supplemented by some limited data collection and analysis. New surveys and detailed refinements of the information base should be deferred until the subsequent detailed phases of the transportation planning process proceed. This last statement, of course, applies only to the Transportation Strategy Study and does not refer to the on-going data collection programs of the City Departments.

PROPOSED APPROACH

General Work Program

In order to provide a basis for estimating the time, staff and budget requirements for the Strategy Study, the overall work program has been divided into fifteen basic activities. These activities and their timing are shown in Figure 2, opposite.

Population and Economic Forecasts

The first activity - population and economic forecasts - will involve a review of existing information and discussions with government, industry and commerce to determine the major factors influencing growth in the region. A range of forecasts of population and employment will then be prepared for the years 1976, 1985 and 2000. The aim of this exercise will not be to make exact predictions of future growth but rather to indicate the range of possibilities and the types of trends and events which could occur over the study period.

On this basis, possible growth patterns can be defined by allocating population and employment opportunities to the zones in the region, including considerations of major activity centres and traffic generators such as the University, shopping centres, and hospitals.

Rail, Airport and Port

In parallel with this activity, an appraisal will be made of potential rail, airport and port developments and traffic growth. This appraisal will take into account existing information, plans and proposals - for example, the current Waterfront Study - and will include interviews with the operators and major users of these services and facilities to determine the characteristics of present traffic, current needs and possible future trends. The possible roles of the railways, port and airport in the future will be identified in consultation with the operators and other parties, and a range of projections will be prepared for modal and inter-modal movements. By this means, a range of alternatives for the development of the port, airport and railways can be identified and the implications of these alternatives on the development of the area and its total transportation system can be evaluated.

Alternative Development Patterns

Several possible directions for growth in the area will be identified in Activity 3. These alternatives will be appraised in

consultation with the Study Committee to select three or four uniquely different, but plausible patterns for study. For example, one pattern may feature decentralized development to the east below the Escarpment, while the second pattern may feature decentralized development to the south on the Mountain. A third concept may focus on a centralized form of development and/or on other possible patterns of development. On this basis, corresponding allocations of population and employment will be made by zone for each concept.

While this study will not consider neighbourhood and urban design details, it will review in broad terms the current planning approach to aspects of urban design which have a direct impact on the provision of transportation services. General commentary and recommendations will therefore be made on items such as arterial street spacing; use of one-way street pairs; traffic control and access provisions; high density development adjacent to arteries; possible separation of pedestrian, trucking, private auto, transit and bicycle traffic; and parking requirements; insofar as these and related policies affect the functional and environmental effectiveness and efficiency with which transportation services can be provided.

Transportation Systems

In parallel with the identification and selection of alternative forms of growth, a variety of possible urban transportation systems will be identified and related to possible development patterns.

Following review with the Study Committee, a set of candidate systems will be selected and described for a computer based analysis.

Computer Input and TARMS Model

As discussed earlier, the TARMS model will be used for the traffic analyses. This model will be tested and validated for the area using 1971 data and, if appropriate, 1969 data.

In order to obtain a quick appreciation of the transportation implications associated with the candidate systems and development concepts, one pattern and system will be analyzed shortly after the outset of the study. This pattern is designated as "A" in Figure 2. This initial computer run will probably be based on a relatively high level of transit service in terms of speed, frequency and coverage, in order to establish an upper boundary on potential transit usage and a corresponding lower boundary for road traffic requirements.

Following a review of the results of run "A", the logic can be established for defining the test runs of the succeeding concepts and systems, shown as "B, C, D" in Figure 2. The population and economic forecasts should be reviewed at this point. The completion of run "A" at the end of month three constitutes the first major milestone of the study program.

The TARMS model has the capability for systems analyses for the years 1976 and 2000. The Department of Transportation and Communications expect to have extended this capability to the year 1985 during

the study but this possibility cannot be confirmed at this time. A capability for evaluating possible 1985 conditions is desirable because 1985 was the horizon year for the H.A.T.S. Plan.

As noted earlier, a simplified commercial vehicles model will be developed to be used in conjunction with the TARMS model. The commercial vehicles model will be approximate but adequate for assessing the implications in terms of truck movements of developments such as a "clean" industrial area on the Mountain.

The development concepts shown as "B, C, D" in Figure 2 will be tested together. Computer runs for the years 1976 and 2000, and possibly 1985, are anticipated with some free flow assignments and some capacity restraint assignments. Two or three levels of transportation service will also be tested.

The computer analyses outlined above will provide a broad coverage of many possibilities. It should be noted, however, that all permutations and combinations of development patterns and transportation systems will not be tested. The computer tests will be selected judiciously to test major issues only. Subjective appraisals will be made for interpolations between the conditions that are tested using the TARMS model.

Following the basic tests of the alternative concepts and associated transportation systems, some variations of these patterns

and systems will be evaluated, if warranted, and time and budget permitting. The second major milestone of the study - the end of month six - will govern the extent to which variations can be explored. On this point, it should be noted that the Strategy Study is only one phase of a continuing planning process. The City of Hamilton will be able to evaluate other concepts and systems as required during the subsequent phases of the transportation planning process as it evolves over time.

Corridor Analyses

The computer output will be summarized to show the profiles and the relative volumes of transit, car, truck and rail movements in the major travel corridors for each test case. Level of service parameters will be obtained by a tabulation showing the relative amounts of vehicle and passenger travel in terms of passenger- and vehicle-miles and hours.

The traffic volume profiles will be used to identify capacity and level of service deficiencies by corridor for each concept and system. Level of service and capacity requirements can then be estimated for the transit and road systems, together with the associated parking system requirements, for each concept and system. On this basis, the candidate transportation systems selected in Activity 4 can be elaborated.

Transportation Costs

The relative capital costs of developing each candidate transportation system will be estimated by using simple cost factor

formulae. These cost factors will be related to type of area and type of facility and will be expressed in per mile terms.

System operating and maintenance costs will also be estimated using simple formulae. These estimates will be in order of magnitude terms and will include vehicles, terminals and ways. The wages of operating and maintenance personnel will be included but not a time cost for system passengers and the drivers of private vehicles.

The relative capital and operating cost streams for each system will be estimated to the year 2000. Simple, but consistent, assumptions will be used regarding the staging of development in order to estimate these cash flows. The estimates will include provisions for the reconstruction of existing facilities over the planning period.

Water and Sewer

The requirements for trunk water and sewerage systems will be considered in identifying possible development patterns and transportation systems. As the study proceeds and concepts are selected for analysis, the associated water and sewerage requirements will be determined in outline form. The capacities and probable staging of these systems will then be estimated.

In order to obtain an appreciation of the relative capital and operating costs of the trunk water and sewerage systems, broad estimates will be made of the capital and operating cash flow streams

through to the year 2000. Again, these estimates will be based on simple and consistent assumptions and will reflect the relative orders of magnitude - for instance, the relative costs of servicing the Mountain area versus the area east of the City below the Escarpment.

Economic and Financial
Implications

This analysis - Activity 10 in Figure 2 - will compare the costs of the transportation systems and the trunk water and sewerage systems with the anticipated revenues associated with these systems. The revenue estimates will be based on the existing water rates, transit fare levels, and licence and fuel taxes. All estimates will be in current dollars.

By necessity, this analysis will be approximate and will involve many simplifying assumptions. Again the object of the exercise is to expose the order-of-magnitude financial implications associated with each scheme under consideration.

Some consideration will be given to potential economic benefits - for instance, the possible economic benefits of improved transit services to the commercial areas in the City. Such estimates will be in relative terms for presentation in a comparative summary of the schemes evaluated.

The direct financial implications to the City under each alternative will be assessed. Financial comparisons will be made

including broad estimates of maximum cash outlays, borrowing requirements, possible cost sharing, possible levels of subsidy, and possible rate, tax and fare levels.

Social and Environmental Considerations

The possible social and environmental effects of candidate transportation developments will be investigated during months four through seven. This appraisal will be aimed at identifying significant factors which should be included in a comparison of different development patterns and transportation systems.

Quality of life is one factor which will be considered. Although this factor can only be appraised subjectively, discussions with various interest groups in Hamilton should provide some guidelines for a relative ranking of alternatives.

Other factors, of course, include the preservation of natural areas, such as the Escarpment and the Harbour, community structure, the effects of noise and air pollution, accident frequency, and access to job opportunities and community facilities. The significance of these and other factors will be appraised in relative terms in order to provide a perspective of the advantages and disadvantages of each alternative. The role of design in resolving social and environmental conflicts will be considered.

Strategies and Policies

As discussed in Chapter II, the results of the study will be summarized in the form of a "strategy table" and a "strategy tree". These presentations will indicate, in tabular and graphical form, the main policy issues which should be addressed over the short and intermediate terms. The effects of short range decisions on the preservation of longer range alternatives will be indicated.

As discussed earlier, it is anticipated that there will be some transportation system improvements which will be common to all of the development concepts studied. These improvements will likely comprise the backlog and short range needs of the City. Such improvements will be summarized in the form of a short range program for the City covering the period 1973 to 1980.

The implications of different levels of investment in transportation improvements will be summarized at this point. For example, the relative effects of two programs - one a minimum program involving stop-gap measures, the second involving a higher rate of investment - could be compared on the basis of level of service, and socio-economic and environmental implications. The relative effectiveness of these two investment strategies would be presented in a strategy table.

Reports and Presentations

As shown in Figure 2, a draft report will be prepared for submission to the Study Committee at the end of month eight. This

submission represents the third milestone of the study.

The purpose of the draft report is to provide a basis for an initial review and discussion of findings with the Study Committee, the City Council and other organizations as appropriate. It is anticipated that a series of four to six presentations will be desirable at this point. These presentations would include meetings with the Board of Control and the City Council, the Planning Board, the Transportation Citizens Committee, and a meeting with interested citizens. Following this initial review, a final report can be issued for further circulation, review and discussion.

Presentations will also be made, as appropriate, to interested groups as the study proceeds. The purpose of these presentations will be to familiarize these groups with the content of the study and to obtain their input to the process. As shown in Figure 2, there will also be regular meetings with the Study Committee to review progress.

IV - ARRANGEMENTS FOR THE STUDY

ALTERNATIVES

Three basic alternatives can be considered for the organization and management of the Transportation Strategy Study. These alternatives for the City of Hamilton are:

1. A consultants study.
2. An "in-house" study using city staff.
3. A joint team approach.

Given the City's objective to foster transportation planning as a continuous process, it would not be appropriate to have the Strategy Study carried out solely by consultants. City staff must be involved in the study in order to take responsibility for the on-going phases of the process.

The second alternative, an "in-house" study using City staff with Provincial support is a slow process because of the limited availability of City staff. Moreover, there is a need for some special skills during this phase of the planning process. This approach may be feasible in subsequent phases when the transportation planning process is more fully established on a continuing basis, and when sufficient staff are available to maintain the process on a regular basis.

For these reasons, the third alternative - the joint team approach is recommended for the Transportation Strategy Study. Under this arrangement, consultants would be retained to assist the City and Provincial staff, and to provide technical direction to the study and some specialized technical services. City and Provincial staff would be assigned to the joint team on a full-time basis for specified intervals of time. In some cases, tasks such as the water and sewer studies would be assigned to a specific department with agreed terms of reference, budget and time allocations.

THE STUDY COMMITTEE

Under the joint team approach, the Study Committee would be responsible for the direction of the Transportation Strategy Study. The membership of the Committee, as approved by the City Council, includes the Traffic and the Planning Commissioners, the City Engineer, the City Treasurer, and representatives of The Hamilton Street Railway and the Ontario Department of Transportation and Communications. Mr. Perry of the City Clerk's Department is the Secretary of the Committee.

The joint team will submit a statement to the Study Committee each month showing the budget expended and progress achieved to date for each task, and outlining the work planned for the next period.

Where appropriate, the Study Committee may from time to time invite others to attend as advisors and observers. For example, it may be appropriate for technical representatives of the County of Wentworth to attend one or more meetings.

TABLE 1

ESTIMATED STAFF AND STUDY SUPPORT REQUIREMENTS

<u>Activity</u>	<u>Estimated Effort¹ (man-days)</u>	<u>City Participation</u>		<u>Consultants Participation (man-days)</u>
		<u>Effort (man-days)</u>	<u>Depart- ment²</u>	
1. Population and Economic Forecasts	35	20	Planning	15
2. Rail, Airport and Port	85	30	Planning	55
3. Alternative Development Patterns	90	50	Planning	40
4. Transportation Systems	120	50	Traffic	70
5. Computer Input	30	15	Traffic	15
6. TARMS Model	40	10	Traffic	30
7. Corridor Analyses	50	25	Traffic	25
8. Transportation Costs	60	20	Engineering	40
9. Water and Sewer	80	80	Engineering	-
10. Economic and Financial Implications	40	10	Treasury	30
11. Social and Environmental Implications	80	40	Planning	40
12. Strategies and Policies	20	Study Committee ³		20
13. Report	30	Study Committee ³		30
14. Presentations	10	Study Committee ³		10
15. Study Committee Meetings	30	Study Committee ³		30
16. Study Management	25	Study Committee ³		25
17. Contingency	40	City Staff ⁴		40
18. Secretarial and Drafting	450	400	Not Determined	50
19. Furnished Office	n/a	n/a	Traffic	n/a
20. Reproduction and Report Printing	n/a	n/a	Not determined	n/a
Total Professional Effort	865	350	n/a	515
Total Support Effort	450	400	n/a	50

1. Does not include the participation of the staff of the Ontario Department of Transportation and Communications.
2. Indicates the Civic Department mainly responsible for each item. Other departments may share the responsibility as appropriate.
3. The extent of the Study Committee's participation has not been estimated but is assumed to be available.
4. To be arranged if necessary with the Study Committee.

THE JOINT TEAM

It is recommended that appropriate consultants be retained to supervise and assist the joint team and to provide some specialized technical services. It is also recommended that the participating agencies assign staff to the joint team on a full-time basis for specified periods of time at appropriate intervals during the study. It is only through the active and continuous participation of these agencies that a truly continuing transportation planning process can be realized.

The estimated staffing requirements of the study are listed by activity and by source in Table 1, opposite. These estimates are based on the general work program described in Chapter III and the expected availability of City staff as indicated during discussions with the Study Committee.

It is estimated that about 865 man-days of effort will be required to complete the Transportation Strategy Study. This effort is equivalent to an average of five professional staff on a full-time basis. In addition to this estimate, approximately 450 man-days of secretarial and drafting services will be required.

As shown in Table 1, it is estimated that the participation of City professional staff in the study will amount to 350 man-days. This estimate does not include the participation of the members of the Study Committee.

On this basis, the estimated requirements for consultants' services is 515 man-days. The consultants' portion of the budget includes the provision of some specialized technical services during the study, the direction of the joint team, and a contingency item of 40 man-days.

It should be noted that these estimates are predicated on two key premises, as follows:

- that experienced professional staff will be assigned to the joint team by the City on a full-time basis for designated periods of time
- that the study will focus on the evaluation of alternatives using existing information with a minimum of new data collection and analysis.

On the basis of the foregoing, it is estimated that the required budget for the consultants retained for the Transportation Strategy Study will be \$100,000. This budget will provide for \$86,000 in professional fees, \$7,000 for expenses, and \$7,000 for the contingency item. It is understood that this budget is eligible for a 75 per cent subsidy from the Ontario Department of Transportation and Communications and that the City's share of the consultant's budget will be \$25,000

In addition, the City should arrange for the provision of approximately 350 man-days for the participation of its professional staff in the joint team. In addition to providing professional staff, it is proposed that the City supply:

- 278000
- Planning -
- office space, furniture, heat, light and phone (the approximately 1,000 square feet of space in the temporary buildings in Jackson Square would be adequate)
 - a full-time secretary/receptionist
 - a full-time draftsman/technician
 - additional typing and drafting services as required (estimated to be equivalent to 100 man-days)
 - reproduction and report printing.

Some of this participation on the part of the City may be eligible for subsidy from the Ontario Department of Transportation and Communications.

In addition to the above, it is understood that the Ontario Department of Transportation and Communications will participate directly in the Transportation Strategy Study. The Department's contribution will include the computer services associated with the TARMS model, responsibility for adapting the model for application in Hamilton, and advisory assistance as determined during the course of the study.

CITY OF HAMILTON

HAMILTON TRANSPORTATION STRATEGY STUDY

STUDY APPROACH

APPENDIX A

LIST OF INTERVIEWS

LIST OF INTERVIEWS

Transportation in the Hamilton area and the approach to transportation planning were discussed with the following organizations and individuals during the course of the assignment to define the Study Approach.

CITY OF HAMILTON

- His Worship Mayor V. K. Copps
- Controller Anne H. Jones
- Controller J. A. Bethune
- Controller H. Turkstra
- Alderman R. Morrow
- Alderman M. C. Cline
- Alderman P. O. Valeriano
- Alderman J. C. Custeau
- Alderman R. Wheeler
- Alderman F. A. Lombardo
- Alderman J. Stowe
- Alderman J. O. Kern
- Alderman K. M. Edge
- Mr. I. S. Farwell, Chairman, Planning Board
- Mr. W. A. Wheten, City Engineer
- Mr. J. Leach, Director, Engineering Planning

- Mr. D. Roughley, Assistant Director, Engineering Planning
- Mr. R. Bailey, Planning Commissioner
- Mr. R. Desjardins, Traffic Commissioner
- Mr. H. Sweinbenz, Assistant Traffic Engineer, Planning
- Mr. J. Jaggard, City Treasurer
- Mr. K. Avery, Deputy City Clerk

COUNTY OF WENTWORTH

- Mr. Gordon Dean, Warden
- ✓ - Mr. H. Gaazenbeak, Planner
- ✓ - Mr. R. Fraser, County Engineer.

HAMILTON STREET
RAILWAY COMPANY

- Mr. P.A.S. Todd, General Manager (to February 29, 1972)
- ✓ - Mr. F. A. Cooke, General Manager (effective March 1, 1972)

HAMILTON HARBOUR
COMMISSION

- Mr. E. D. Hickey, Q.C., Chairman
- Mr. J. A. Lanza, Commissioner
- Mr. K. R. Elliott, Commissioner
- Mr. E. M. Perkins, Port Director
- ✓ - Mr. C. G. Furry, Secretary
- Mr. W. Flewelling, Manager, Trade Development.

HAMILTON ECONOMIC
DEVELOPMENT COMMISSION

- ✓ - Mr. J. H. Moore, Economic Development Commissioner.

HAMILTON CHAMBER
OF COMMERCE

- ✓ - Mr. B. W. Gillespie, General Manager
- Mr. P. Johnson
- Mr. R. Batra.

HAMILTON AUTOMOBILE CLUB

- ✓ - Mr. A. V. Oakie, Managing Director
- Mr. R. Smith.

TASK FORCE ON URBAN TRANSPORTATION
(Chamber of Commerce and The
Hamilton Automobile Club)

- Mr. A. H. Lomax, Consultant
- Mr. J. Clark
- Mr. O. Moffat
- Mr. S. Fletcher.

HAMILTON TRUCKING COUNCIL

- ✓ - Mr. J. Kennelly.

TOWN OF BURLINGTON

- ✓ - His Worship Mayor G. Harrington
- Mr. R. Roberts, Town Planner
- Mr. R. Baillie, Town Engineer

ONTARIO DEPARTMENT OF
TRANSPORTATION AND
COMMUNICATIONS

- Mr. R. A. Ballantine, Urban Transportation Planner,
Systems Planning Branch
- Mr. V. C. Ma, Urban Transportation Planner,
Systems Planning Branch
- Mr. J. S. Lucey, Urban Transportation Planner,
Systems Planning Branch
- Mr. B. Flannigan, Systems Planning Branch

ONTARIO DEPARTMENT OF
TREASURY AND ECONOMICS

- ✓ - Mr. A. R. Schmidt, Section Head, Toronto Centred
Region
- Mr. J. Wessinger, Regional Analyst, Northeastern
and Northwestern Ontario Regions

CANADIAN NATIONAL

- ✓ - Dr. R. A. Bandeen, Vice-President, Great Lakes Region
- Mr. W. D. Piggott, Assistant Vice-President, Great
Lakes Region
- Mr. S. E. Spencer, Regional Operations Manager

CANADIAN NATIONAL (Cont'd.)

- Mr. W.J. Wanamaker, Regional Engineer, Great Lakes Region
- Mr. F. S. Hutton, Project Manager, Welland Canal Project.

TORONTO, HAMILTON AND
BUFFALO RAILWAY

- ✓ - Mr. John Hill, Superintendent.

STEEL COMPANY OF
CANADA LIMITED

- ✓ - Mr. A. B. Fisher, Vice-President
- Mr. L. Chater, Manager of Engineering
- Mr. A. A. Burkill, Supervisor, Industrial Engineering
- Mr. P. Burns, Transportation Supervisor, Railways.

DOMINION FOUNDRIES
AND STEEL LIMITED

- ✓ - Mr. D. Samson, Assistant to Vice-President, Engineering
- Mr. K. Firth, Manager, Materials Handling Services
- Mr. H. Ireland, Engineering

CITY OF HAMILTON

HAMILTON TRANSPORTATION STRATEGY STUDY

STUDY APPROACH

APPENDIX B

LIST OF REFERENCES

LIST OF REFERENCES

The following documents were obtained and reviewed during this assignment to define the Study Approach.

<u>AGENCY</u>	<u>TITLE</u>	<u>AUTHOR</u>	<u>DATE</u>
City of Hamilton	Traffic and Transportation Plan for Hamilton	Wilbur Smith & Associates	1956
City of Hamilton	Hamilton Area Transportation Study, Scope and Procedures	C. C. Parker & Parsons Brinckerhoff Ltd.	1961
City of Hamilton	Hamilton Area Transportation Plan	C. C. Parker & Parsons Brinckerhoff Ltd.	1963
City of Hamilton	Amendment #228 to the 1967 Official Plan for the Undeveloped Areas of Hamilton	Planning Department	1970
City of Hamilton	Draft Official Plan 1970, Rapid Transit	Planning Department	1970
City of Hamilton	Central Area Study	Planning Department	1971
City of Hamilton	Housing Market Analysis	Planning Department	1971
City of Hamilton	A Planning Framework for the Year 2000	Planning, Engineering, and Traffic Departments	1970
City of Hamilton	Financial Report, 1970	Treasury Department	1971
City of Hamilton	Estimates, 1971	Treasury Department	1971
City of Hamilton	5 Year Capital Budget Program 1971 - 1975	Treasury Department	1971
City of Hamilton	Report concerning the Hamilton Street Railway Company and its wholly owned subsidiary The Canada Coach Lines Ltd.	Norman D. Wilson Cameron K. MacGillivray Kenneth A. Foulds	1959

<u>AGENCY</u>	<u>TITLE</u>	<u>AUTHOR</u>	<u>DATE</u>
Hamilton Transit Commission	Wentworth - Burlington Suburban Bus Study	DeLeuw, Cather & Co. of Canada Ltd.	1971
Hamilton Transit Commission	Hamilton Area Rapid Transit Study, Physical Feasibility Report, Books 1 and 2	DeLeuw, Cather & Co. of Canada Ltd.	1970
Hamilton Transit Commission	Annual Reports	-	1959-1970
Hamilton Economic Development Commission	Commercial Development in Hamilton	Arthur D. Little, Inc.	1968
Hamilton - Wentworth Suburban Roads Commission	Report of the Planning, Engineering, Traffic Technical Committee respecting the Hamilton - Wentworth Suburban Road System	-	1970
Hamilton - Burlington - Wentworth Local Government Review	Data Book of Basic Information	-	1968
Hamilton - Burlington - Wentworth Local Government Review	Report and Recommendations	-	1969
Ontario Housing Corporation	Saltfleet Community Development	Ekistics Consultants Ltd. Hugh Wilson and Lewis Womersley Ltd.	1969
Steel Company of Canada	Stelco - Burlington Street Traffic Study	-	1965
Steel Company of Canada	Industrial Development in Southern Ontario - Year 2000	A. D. Fisher	1970
Department of Treasury and Economics	Design for Development - The Toronto-Centred Region	Regional Development Branch	1970

<u>AGENCY</u>	<u>TITLE</u>	<u>AUTHOR</u>	<u>DATE</u>
Department of Treasury and Economics	Design for Development - A Status Report on the Toronto-Centred Region	Regional Development Branch	1971
Metropolitan Toronto and Region Transportation Study	Study of Regional Economic Prospects	Larry Smith & Co.	1965
Metropolitan Toronto and Region Transportation Study	Growth and Travel, Past and Present	-	1966
Metropolitan Toronto and Region Transportation Study	Choices for a Growing Region	-	1967
Metropolitan Toronto and Region Transportation Study	Transportation for the Regional City	-	1967
Department of Highways	GO Transit, Evaluation and Alternatives for Expansion	-	1969
Department of Transportation and Communications	A Brief Description of the Toronto Area Regional Model Study (TARMS)	Systems Planning Branch	1971
Department of Transportation and Communications	Modal Split, TARMS	Systems Planning Branch	1971
Department of Transportation and Communications	Trip Generation, TARMS	Systems Planning Branch	1971
Town of Dundas	Transportation Study, 1966-1990	J. M. Tomlinson & Associates Ltd.	1970

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